a. Develop SQL code to create the entire database schema, reflecting the constraints identified in previous steps.

```
import sqlite3
import pandas as pd

db_connect = sqlite3.connect('projPt3.db')

cursor = db_connect.cursor()


#  passing queries to cursor by storing query in string variable
staff_query = """
        CREATE TABLE IF NOT EXISTS Staff (
        staffNo VARCHAR(8) NOT NULL PRIMARY KEY,
        name VARCHAR(35) NOT NULL,
        phoneNo INT NOT NULL UNIQUE,
        address VARCHAR(50) NOT NULL,
        DOB TEXT,
        position VARCHAR(25) NOT NULL,
        salary INT,
        clinicNo VARCHAR(8) NOT NULL,
        FOREIGN KEY (clinicNo) REFERENCES Clinic
    );
    """

clinic_query = """
        CREATE TABLE IF NOT EXISTS Clinic (
        clinicNo VARCHAR(8) NOT NULL PRIMARY KEY,
        name VARCHAR(35),
        address VARCHAR(50) UNIQUE,
        phoneNo INT NOT NULL UNIQUE,
        managerNo VARCHAR(8) NOT NULL,
        FOREIGN KEY (managerNo) REFERENCES Staff(staffNo)
    );
    """
```

```
pet_query = """
        CREATE TABLE IF NOT EXISTS Pet (
        petNo VARCHAR(8) NOT NULL PRIMARY KEY,
        name VARCHAR(35) NOT NULL,
        species VARCHAR(25) NOT NULL,
        breed VARCHAR(25) NOT NULL,
        color VARCHAR(15),
        DOB TEXT,
        clinicNo VARCHAR(8) NOT NULL,
        ownerNo VARCHAR(8) NOT NULL,
        FOREIGN KEY (ownerNo) REFERENCES Owner,
        FOREIGN KEY (clinicNo) REFERENCES Clinic
    );
    """

pet_owner_query = """
        CREATE TABLE IF NOT EXISTS PetOwner(
        ownerNo VARCHAR(8) NOT NULL PRIMARY KEY,
        name VARCHAR(35),
        phoneNo INT,
        address VARCHAR(50) NOT NULL
    );
    """

examination_query = """
        CREATE TABLE IF NOT EXISTS Examination (
        examNo VARCHAR(8) NOT NULL PRIMARY KEY,
        chiefComplaint VARCHAR(500) NOT NULL,
        description VARCHAR(500),
        dateSeen TEXT NOT NULL,
        actions VARCHAR(100),
        petNo VARCHAR(10) NOT NULL,
        staffNo VARCHAR(10) NOT NULL,
        FOREIGN KEY (petNo) REFERENCES Pet,
        FOREIGN KEY (staffNo) REFERENCES Staff
    );
    """
```

```
cursor.execute(staff_query)
cursor.execute(clinic_query)
cursor.execute(pet_query)
cursor.execute(pet_owner_query)
cursor.execute(examination_query)
```

b. Create at least 5 tuples for each relation in your database.

```
# Create at least 5 tuples for each realtion in your database
insert_clinic_rows = """
    INSERT OR IGNORE INTO Clinic
    VALUES
        ('CL001', 'Paws and Claws Westbrook Clinic', '123 Canine St', 7544654672, 'ST045'),
        ('CL002', 'Paws and Claws Knight Clinic', '456 Feline Rd', 7891234567, 'ST023'),
        ('CL003', 'Miami-Dade Regional Clininc', '789 Reptile Ave', 2649876543, 'ST009'),
        ('CL004', 'Central Florida Clinic ', '777 Bird Lane', 7542018786, 'ST001'),
        ('CL005', 'Kingston Downtown Pet Clinic', '101 Fish Blvd', 7542098735, 'ST076');
    """
insert_staff_rows = """
    INSERT OR IGNORE INTO Staff
    VALUES
        ('ST045', 'Jane Doe', 1234567890, '267 Gingerbread Lane', '1989-12-25', 'Manager', 40000, 'CL001'),
        ('ST023', 'Jack Doe', 7544567899, '321 Mystery Blvd',  '1986-09-01', 'Manager', 40000, 'CL002'),
        ('ST009', 'Ben Richards', 7544678902, '425 London Rd', '1994-06-28', 'Manager', 45000, 'CL003'),
        ('ST001', 'Diego Gogo', 7548791234, '117 Swiper St', '1979-02-15', 'Manager', 40000, 'CL004'),
        ('ST076', 'Dora Explorer', 7890001111, '123 Boots Ave', '1990-11-10', 'Manager', 50000, 'CL005');
    """

insert_pet_rows = """
    INSERT OR IGNORE INTO Pet
    VALUES
        ('P0001', 'Simba', 'Cat', 'Maine Coon', 'Grey', '2020-09-11', 'OW001', 'CL001'),
        ('P0002', 'Sagicor', 'Cat', 'Ragdoll', 'White', '2016-07-18', 'OW003', 'CL002'),
        ('P0003', 'Hershey', 'Dog', 'German Sheperd', 'Brown', '2019-01-01', 'OW002', 'CL003'),
        ('P0004', 'Bobby', 'Dog', 'Akita', 'Black', '2013-04-30', 'OW004', 'CL004'),
        ('P0005', 'Sunshine', 'Bird', 'Parrot', 'Green', '2018-12-14', 'OW005', 'CL005');
    """
```

```
insert_pet_owner_rows = """
    INSERT OR IGNORE INTO PetOwner
    VALUES
        ('OW001', 'James Madison', 7453627899, '123 Miracle Dr'),
        ('OW002', 'Isabel Kathryn', 7542098716, '456 Song Blvd'),
        ('OW003', 'Joseph McFarlane', 7542098777, '789 Disney Ave'),
        ('OW004', 'Joanna Allison', 7897543672, '400 Miami Lane'),
        ('OW005', 'Peter Johnson', 7890002678, '3756 Jamaica St');
    """

insert_examination_rows = """
    INSERT OR IGNORE INTO Examination
    VALUES
        ('EX001', 'Monthly Physical Check-Up', 'Monthly  physical well being check', '2022-11-21', 'None', 'P0001', 'ST001'),
        ('EX002', 'Dental Cleaning', 'Special cleaning to treat gingivitis', '2022-11-22', 'Full cleaning done', 'P0002', 'ST076'),
        ('EX003', 'Vaccination', 'Got tetanus shot', '2022-11-23', 'Vaccination administered', 'P0003', 'ST009'),
        ('EX004', 'Neutering', 'Had tubes tied', '2022-11-24', 'Wound Cleaning solution prescribed', 'P0004', 'ST023'),
        ('EX005', 'Monthly Physical Check-Up', 'Monthly  physical well being check', '2022-12-01', 'None', 'P0005', 'ST045');
    """

cursor.execute(insert_staff_rows)
cursor.execute(insert_clinic_rows)
cursor.execute(insert_pet_rows)
cursor.execute(insert_pet_owner_rows)
cursor.execute(insert_examination_rows)
```

```
================================================================================================================
================================================================================================================
  clinicNo                            name          address   managerNo phoneNo
0    CL001  Paws and Claws Westbrook Clinic    123 Canine St  7544654672   ST045
1    CL002     Paws and Claws Knight Clinic    456 Feline Rd  7891234567   ST023
2    CL003      Miami-Dade Regional Clininc  789 Reptile Ave  2649876543   ST009
3    CL004          Central Florida Clinic     777 Bird Lane  7542018786   ST001
4    CL005     Kingston Downtown Pet Clinic    101 Fish Blvd  7542098735   ST076
================================================================================================================
  staffNo           name     address              phoneNo         DOB position  salary clinicNo
0   ST045       Jane Doe  1234567890  267 Gingerbread Lane  1989-12-25  Manager   40000    CL001
1   ST023       Jack Doe  7544567899      321 Mystery Blvd  1986-09-01  Manager   40000    CL002
2   ST009   Ben Richards  7544678902         425 London Rd  1994-06-28  Manager   45000    CL003
3   ST001     Diego Gogo  7548791234         117 Swiper St  1979-02-15  Manager   40000    CL004
4   ST076  Dora Explorer  7890001111         123 Boots Ave  1990-11-10  Manager   50000    CL005
================================================================================================================
   petNo      name species           breed    DOB       color ownerNo clinicNo
0  P0001     Simba     Cat      Maine Coon   Grey  2020-09-11   OW001    CL001
1  P0002   Sagicor     Cat         Ragdoll  White  2016-07-18   OW003    CL002
2  P0003   Hershey     Dog  German Sheperd  Brown  2019-01-01   OW002    CL003
3  P0004     Bobby     Dog           Akita  Black  2013-04-30   OW004    CL004
4  P0005  Sunshine    Bird          Parrot  Green  2018-12-14   OW005    CL005
================================================================================================================
  ownerNo             name     phoneNo          address
0   OW001     James Madison  7453627899   123 Miracle Dr
1   OW002    Isabel Kathryn  7542098716    456 Song Blvd
2   OW003  Joseph McFarlane  7542098777    789 Disney Ave
3   OW004    Joanna Allison  7897543672    400 Miami Lane
4   OW005     Peter Johnson  7890002678  3756 Jamaica St
================================================================================================================
  examNo             chiefComplaint                          description    dateSeen
0  EX001  Monthly Physical Check-Up    Monthly  physical well being check  2022-11-21
1  EX002            Dental Cleaning  Special cleaning to treat gingivitis  2022-11-22                 Full cle
2  EX003                Vaccination                      Got tetanus shot  2022-11-23          Vaccination ad
3  EX004                  Neutering                        Had tubes tied  2022-11-24  Wound Cleaning solution
4  EX005  Monthly Physical Check-Up    Monthly  physical well being check  2022-12-01
****************************************************************************************************************
```

c. Develop 5 SQL queries using embedded SQL (see Python tutorial).

```
clinic_query = """
    SELECT * FROM Clinic
    """
staff_query = """
    SELECT * FROM Staff
    """
pet_query = """
    SELECT * FROM Pet
    """
pet_owner_query = """
    SELECT * FROM PetOwner
    """
examination_query = """
    SELECT * FROM Examination
    """

querylist = [clinic_query, staff_query, pet_query, pet_owner_query, examination_query]

print("=========================================================================================================================================")
for q in querylist:
    cursor.execute(q)
    column_names = [row[0] for row in cursor.description]
    table_data = cursor.fetchall()
    df = pd.DataFrame(table_data, columns=column_names)
    print("=========================================================================================================================================")
    print(df)

instruction1 = "List the pet names, and pet's owner names, breeds and species for all pets whose owner's name starts with a J"
query1 = """
    SELECT p.name AS pet_name, o.name AS owner_name, p.species, p.breed
    FROM Pet p, PetOwner o
    WHERE p.ownerNo = o.ownerNo AND o.name LIKE 'J%'
    """
instruction3  = "List all the managers "
```

```
instruction4 = "List all examinations number, complaint and date seen and petNo"
query4 = """
    SELECT examNo, dateSeen, chiefComplaint, petNo
    FROM Examination
    """
instruction5 = "List the amount of staff working at each clinic"
query5 = """
    SELECT c.clinicNo, COUNT(staffNo) AS staff_amt
    FROM Clinic c, Staff s
    WHERE s.clinicNo = c.clinicNo
    GROUP BY c.clinicNo
    """
instruction2 = "List all pet owner's pets."
query2 = """
    SELECT petNo, p.ownerNo, o.name
    FROM PetOwner o, Pet p
    WHERE o.ownerNo = p.ownerNo
    """

queries = [(query1, instruction1), (query2, instruction2), (query3, instruction3), (query4, instruction4), (query5, instruction5)]
print("*****************************************************************************************************************************")
print("QUERIES")
```

```
for (query, instruction) in queries:
    cursor.execute(query)
    column_names = [row[0] for row in cursor.description]
    table_data = cursor.fetchall()
    df = pd.DataFrame(table_data, columns=column_names)
    print("*****************************************************************************************************************************")
    print(instruction)
    print(df)
print("*****************************************************************************************************************************")

db_connect.close()
```

```
**********************************************************************************************************************
QUERIES
**********************************************************************************************************************
List the pet names, and pet's owner names, breeds and species for all pets whose owner's name starts with a J
  pet_name        owner_name species       breed
0    Simba     James Madison     Cat  Maine Coon
1  Sagicor  Joseph McFarlane     Cat     Ragdoll
2    Bobby    Joanna Allison     Dog       Akita
**********************************************************************************************************************
List all pet owner's pets.
   petNo ownerNo              name
0  P0001   OW001     James Madison
1  P0002   OW003  Joseph McFarlane
2  P0003   OW002    Isabel Kathryn
3  P0004   OW004    Joanna Allison
4  P0005   OW005     Peter Johnson
**********************************************************************************************************************
List all the managers
  staffNo           name position  salary
0   ST045       Jane Doe  Manager   40000
1   ST023       Jack Doe  Manager   40000
2   ST009   Ben Richards  Manager   45000
******
List all examinations number, complaint and date seen and petNo
  examNo    dateSeen             chiefComplaint  petNo                                                              *
0  EX001  2022-11-21  Monthly Physical Check-Up  ST001
1  EX002  2022-11-22            Dental Cleaning  ST076
2  EX003  2022-11-23                Vaccination  ST009
3  EX004  2022-11-24                  Neutering  ST023
4  EX005  2022-12-01  Monthly Physical Check-Up  ST045
**********************************************************************************************************************
******
List the amount of staff working at each clinic                                                                       *
  clinicNo  staff_amt
0    CL001          1
1    CL002          1
2    CL003          1
3    CL004          1
4    CL005          1
**********************************************************************************************************************
```

d. Upload all the code and documentation to GitHub.

See github repository at : https://github.com/isabel-png/csc423